AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-38. (cancelled)

39. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals, the decoder comprising:

steering signal logic in communication with the audio input signals, the steering signal logic producing a plurality of steering signals; and

at least one matrix comprising matrix coefficients, the matrix is in communication with the steering signal logic and the audio input signals, the matrix combines the audio input signals with the matrix coefficients to produce a plurality of signals;

where, when the signals are combined to produce the output signals, a total power in the audio output signals is substantially equal to a total power of the audio input signals.

40. (Previously presented) The decoder of claim 39, further comprising:

adders in communication with the matrix, the adders combining the signals to produce the audio output signals.

41. (Previously presented) The decoder of claim 39, where the decoder is implemented by computer logic according to computer-executed instructions.

42. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals, the decoder comprising logic for:

producing steering signals; and

producing the audio output signals as a function of the steering signals, a total power in the audio output signals being substantially equal to a total power of the audio input signals.

43. (Previously presented) The decoder of claim 42, where the logic for producing the audio output signals comprises logic for producing signals as a function of the steering signals, the signals being combined to produce the audio output signals.

44. (Previously presented) The decoder of claim 42, further comprising logic for combining the signals to produce the audio output signals.

45. (Previously presented) A decoder for decoding audio input signals, comprising a right input signal and a left input signal, into audio output signals, comprising an unsteered component, a directional component, a left-front output signal, and right-front output signal, the decoder comprising:

steering signal logic in communication with the audio input signals, the steering signal logic produces a plurality of steering signals defining a direction of the audio output signals; and

at least one matrix comprising matrix coefficients, the matrix is in communication with the steering signal logic and the audio input signals, the matrix combines the audio input signals with the matrix coefficients to produce a plurality of signals, the signals being combined to produce the output signals;

where at least a subset of the matrix coefficients is a function of the steering signals that, when the direction is a forward direction, separates the unsteered component in the left-front and right-front output signals, localizes the directional component, and substantially preserves power balance between the right input signal and left input signal and between the left-front output signal and right-front output signal.

46. (Previously presented) The decoder of claim 45, further comprising:

adders in communication with the matrix, the adders combining the signals to produce the audio output signals.

47. (Previously presented) The decoder of claim 45, where the audio output signals further comprise a center output signal, and when the direction is a forward direction, the subset of the matrix coefficients reduces the center output signal to separate the unsteered component produced in the left-front and right-front output signals, and as the forward direction becomes more forward, the subset of the matrix coefficients increases the center output signal to localize the directional component.

48. (Previously presented) The decoder of claim 47, where the audio input signals comprise a center component, and the subset of the matrix coefficients comprises left-front matrix coefficients and right-front matrix coefficients that reduce the center component in the left-front and right-front output signals.

49. (Previously presented) The decoder of claim 48, where the subset of the matrix coefficients increases the center output signal to maintain total power of the audio input signals in the audio output signals.

50. (Previously presented) The decoder of claim 49, where the subset of the matrix coefficients increases the center output signal to maintain the total power of the audio input signals in the audio output signals when the left-front, right-front, and center output signals are substantially equal in level.

51. (Previously presented) The decoder of claim 47, where the subset of the matrix coefficients increases the center output signal by a first amount when the forward direction is about 0 degrees to about 22.5 degrees, and by a second amount when the forward direction is about 22.5 degrees to about 45 degrees.

52. (Previously presented) The decoder of claim 51, where the subset of the matrix coefficients alter a center component in the left-front and right-front output signals to maintain total power of the audio input signals in the audio output signals.

53. (Previously presented) The decoder of claim 52, where the subset of the matrix coefficients limits the forward direction when the center component is stronger in the center output signal than in either the left-front output signal or the right-front output signal.

54. (Previously presented) The decoder of claim 45, where the subset of the matrix coefficients defines a surface comprising axes defined by the steering signals, and defines a boost along one of the axes that localizes the directional component.

55. (Previously presented) The decoder of claim 54, where the steering signals comprises a center-surround steering signal, and the boost is along the axis defined by the center-surround steering signal.

56. (Previously presented) The decoder of claim 55, where the audio input signals comprises a center component, and the subset of the matrix coefficients comprises left-front matrix coefficients and right-front matrix coefficients that reduce the center component in the left-front and right-front output signals.

57. (Previously presented) The decoder of claim 56, where the boost maintains total power of the audio input signals in the audio output signals.

58. (Previously presented) The decoder of claim 57, where the boost maintains the total power of the audio input signals in the audio output signals when the left-front, right-front, and center output signals are substantially equal in level.

59. (Previously presented) The decoder of claim 54, where the boost comprises a first amount when the forward direction is about zero degrees to about 22.5 degrees, and a second amount when the forward direction is about 22.5 degrees to about 45 degrees.

60. (Previously presented) The decoder of claim 59, where the second amount is greater than the first amount.

61. (Previously presented) The decoder of claim 58, where the matrix coefficients further comprises left-front matrix elements and right-front matrix elements that alter the center component in the left-front and right-front output signals to maintain the total power of the audio input signals in the audio output signals.

62. (Previously presented) The decoder of claim 61, where the left-front matrix elements and the right-front matrix elements alter the center component in the left-front and right-front output signals to maintain the total power of the audio input signals in the audio output signals when the center component is stronger in the center output signal than in either the left-front or right-front output signals.

63. (Previously presented) The decoder of claim 62, where the left-front matrix elements and the right-front matrix elements alter the center component when the center component is about 6 dB stronger in the center output signal.

64. (Previously presented) The decoder of claim 45, where the decoder is implemented by computer logic according to computer-executed instructions stored in a computer-readable medium.

65. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals that comprises an unsteered component, the decoder comprising:

steering signal logic in communication with the plurality of audio input signals and producing a plurality of steering signals;

at least one matrix comprising matrix coefficients, the matrix is in communication with the steering signal logic and the audio input signals, and the matrix combines the audio input

signals with the matrix coefficients to produce a plurality of signals which are combined to produce the audio output signals,

where at least some of the matrix coefficients that produce the signals are a function of the steering signals such that the unsteered component of the output signals is at a constant level independent of the steering signals.

66. (Previously presented) The decoder of claim 65, further comprising adders in communication with the matrix, the adders combining the signals to produce the audio output signals.

67. (Previously presented) The decoder of claim 66, where the decoder is implemented by computer logic according to computer-executed instructions stored in a computer-readable medium.

68. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals that comprises an unsteered component, the decoder comprising logic for:

producing steering signals; and

producing the audio output signals as a function of the steering signals such that the unsteered component of the output signals is at a constant level independent of the steering signals.

69. (Previously presented) The decoder of claim 68, where the logic for producing the audio output signals comprises logic for producing signals as a function of the steering signals, the signals being combined to produce the audio output signals.

70. (Previously presented) The decoder of claim 69, further comprising logic for combining the signals to produce the plurality of audio output signals.

71. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals comprising front output signals, the decoder comprising:

steering signal logic in communication with the plurality of audio input signals and producing a plurality of steering signals that define a direction;

at least one matrix comprising matrix coefficients, the matrix is in communication with the steering signal logic and the audio input signals, the matrix combines the audio input signals

with the matrix coefficients to produce a plurality of signals which are combined to produce the audio output signals,

where a subset of the matrix coefficients is a function of the steering signals that causes the front output signals to equal about zero when the direction is about a rear direction.

72. (Previously presented) The decoder of claim 71, further comprising adders in communication with the matrix, the adders combining the signals to produce the audio output signals.

73. (Previously presented) The decoder of claim 71, where the rear direction includes a left-rear direction and a right-rear direction, and the subset of the matrix coefficients causes the front output signals to equal about zero when the direction is from about the left-rear direction to about the right-rear direction.

74. (Previously presented) The decoder of claim 71, where the subset of the matrix coefficients comprises left-front matrix coefficients and right-front matrix coefficients, defines a surface comprising axes defined by the steering signals, and comprises a cut along one of axes that causes the front output signals to equal about zero when the direction is about the rear direction.

75. (Previously presented) The decoder of claim 74, where the steering signals comprises a center-surround steering signal, and the subset of the matrix coefficients comprises the cut along an axis defined by the center-surround steering signal.

76. (Previously presented) The decoder of claim 71, where the audio input signals comprises a directional component, an unsteered component, and a power balance between the directional component and the unsteered component, and the matrix coefficients comprises rear matrix coefficients, which are a function of the steering signals that maintains power balance in the audio output signals.

77. (Previously presented) The decoder of claim 71, where the matrix elements defines a surface as a function of the steering signals, where the surface comprises quadrants and is substantially continuous among the quadrants.

78. (Previously presented) The decoder of claim 71, where the decoder is implemented by computer logic according to computer-executed instructions stored in a computer-readable medium.

79. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals comprising a plurality of front output signals, the decoder comprising logic for:

producing steering signals; and

producing the audio output signals as a function of the steering signals such that the front output signals equal about zero when the direction is about a rear direction.

80. (Previously presented) The decoder of claim 79, where the logic for producing the audio output signals comprises logic for producing signals as a function of the steering signals, the signals being combined to produce the audio output signals.

81. (Previously presented) The decoder of claim 80, further comprising logic for combining the signals to produce the audio output signals.

82. (Previously presented) A decoder for decoding a plurality of audio input signals into a plurality of audio output signals, the decoder comprising:

steering signal logic in communication with the plurality of audio input signals, the steering signal logic producing a plurality of steering signals;

at least one matrix comprising matrix coefficients, the matrix is in communication with the steering signal logic and the audio input signals, the matrix combines the audio input signals with the matrix coefficients to produce signals which are combined to produce the audio output signals,

where the matrix coefficients are a function of the steering signals, the matrix coefficients define a surface, the surface comprises quadrants defined by the steering signals, where the surface is substantially continuous across the quadrants.

83. (Previously presented) The decoder of claim 82, further comprising adders in communication with the matrix, the adders combining the signals to produce the audio output signals.

84. (Previously presented) The decoder of claim 82, where the matrix coefficients comprise rear matrix coefficients that define the surface.